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The issuance of this publication approved by the Secretary of the Navy on 28 June 1961.

Idiopathic Fibrous and Fibromuscular Stenoses of the
Renal Arteries Associated with Hypertension

James C. Hunt, Section of Medicine; Edgar G. Harrison Jr, Section of Surgical Pathology; Owings W. Kincaid, Section of Diagnostic Roentgenology; Philip E. Bernatz, Section of Surgery; George D. Davis, Section of Diagnostic Roentgenology. Proceedings of the Staff Meetings of the Mayo Clinic 37: 181-216, March 28, 1962.

Isolated reports of surgical relief of hypertension in patients with fibrous or fibromuscular occlusive lesions of the renal arteries have appeared with increasing frequency in recent years. Leadbetter and Burkland, in 1938, described the case of a five and one-half-year old boy with hypertension who was found to have an ectopic right kidney with what these investigators concluded to be a developmental anomaly of the right renal artery. Right nephrectomy resulted in relief of the hypertension. A photomicrograph of the resected renal artery revealed changes which have subsequently been termed "fibromuscular hyperplasia of the renal arteries." Boyd, in the same issue of the Journal of Urology, described the case of a 31-year old man with malignant hypertension associated with a partially infarcted right kidney and a markedly thickened renal artery. Although the histologic findings were less completely described, it is probable that this case represented a disease process similar to the fibromuscular stenoses subsequently reported in the literature.

The case of a 32-year old hypertensive male patient with subintimal fibrosis and partial occlusion of a secondary renal artery was described by Perry. A short segment of the main renal artery that was removed at operation was not occluded. Nephrectomy resulted in relief of the hypertension which was assumed to have been secondary to occlusive disease of the renal artery. It seems probable that the lesion described was similar to those noted by Goodman and by McCormack and associates; the McCormack group described four vessels in three young persons who had unusual "fibromuscular hyperplasia" with severe segmental stenosis of the vessels. Many other reports appear in the literature.

The authors review some of their recent experience with hypertensive patients who proved to have nonatheromatous stenosing lesions of the renal arteries. Particular reference is made to the clinical features, arteriographic observations, and histologic changes in the renal arteries. Their criteria for the selection and diagnostic study of hypertensive patients for evidence of renal artery lesions have been described in *Circulation* 24: 898, October 1961, and the *American Journal of Cardiology* 9: 134-140, January 1962. Case histories of 23 patients with fibrous or fibromuscular stenoses of the renal arteries are summarized in Table 1 (page 4). The results of special studies undertaken in the search for evidence of stenotic lesions of the renal arteries are recorded. In addition, cystoscopic examination, bilateral ureteral catheterization, and multiple function tests of the individual kidneys were undertaken in 18 of the 23 patients, but the results are not reported in this paper.

TABLE I
Clinical Observations in 23 Patients With Fibrous or
Fibromuscular Stenotic Lesions of Renal Arteries

Case	Age	Sex	Symptoms	Known duration of hypertension, years	Blood pressure, mm. Hg	Bruit*	Fundus†
1	31	M	Hematuria, rt. flank pain	1	190/140	O	A
2	42	F	Angina, headache	6	220/140	R	IV
3	42	F	None	5	170/100	R & L	A
4	28	F	Headache	½	240/150	R & L	III
5	48	F	None	1	218/120	L	IV
6	35	M	None	½	190/110	O	A
7	19	F	Headache	2	220/120	L	A
8	20	F	Headache	3	190/120	R	A
9	26	F	None	1	200/130	R	A
10	29	F	Headache	3	190/110	R	A
11	34	F	Headache	1	190/120	R	II
12	24	F	Headache, anemia	7	230/135	R	A, IV
13	45	F	Headache	7	200/120	R	II
14	41	F	Headache	10	230/130	—	IV
15	16	M	None	½	180/130	R	A
16	17	M	None	¾	180/120	R & L	II
17	58	M	Headache	3	225/140	L	III
18	51	M	Headache, heart failure	1	200/150	—	IV
19	19	F	None	1	160/110	—	A
20	18	F	Headache	½	200/120	R	A, IV
21	42	F	Headache	10	190/120	R	A
22	38	F	Headache	6	210/110	R	I
23	53	F	Headache	5	180/120	R	II

* Continuous bruit in upper portion of abdomen; R = right, L = left, O = absent, — = no observation.

† Optic fundus, Keith-Wagener-Barker groups I to IV; A = acute angiospastic changes.

Arteriographic Findings

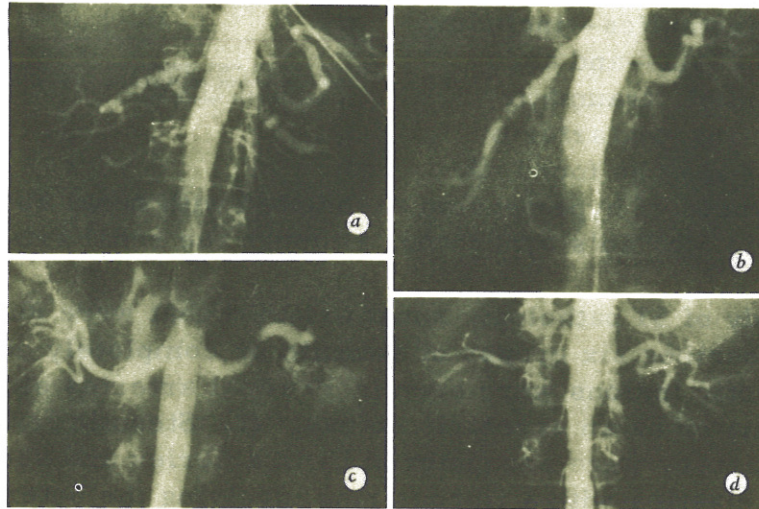
Renal arteriography was performed in 22 of the 23 cases in this series (one patient was sensitive to contrast medium). In 15 patients the examination was carried out by means of translumbar aortography; in the remaining 7 the retrograde transfemoral method was employed. In each instance the renal arteriogram was considered technically satisfactory. The renal arteriograms obtained with the retrograde transfemoral method, however, were considered to be of higher diagnostic quality than those obtained by the translumbar technic. Fig. 1 (page 5) reveals some of the findings.

Surgical Findings

Of 23 patients included in this study, 21 have been subjected to surgery. Exploration was undertaken by anterior or anterior-lateral abdominal incisions. The

renal arteries were examined from their site of origin from the aorta to the point of entrance into the kidney. Determinations of arterial pressure within the abdominal aorta and the proximal and distal portions of the renal artery or its primary divisions were made in most instances. Biopsy of the kidney, or renal arteries, or both, was frequently performed for histologic study. Fibrous or fibromuscular stenosis of the renal arteries as noted by arteriography was confirmed in all instances.

FIGURE 1



a (case 5). Translumbar aortorenal arteriogram demonstrating multiple areas of stenoses with intervening normal or dilated segments, resulting in characteristic beaded appearance of medial fibromuscular stenosis. Changes involve distal two thirds of both renal arteries with involvement of primary branches on left. *b* (case 3). Percutaneous retrograde aortorenal arteriogram illustrating medial fibromuscular stenosis localized to middle third of right main renal artery. *c* (case 7). Retrograde (arteriotomy) aortorenal arteriogram. Note abrupt concentric narrowing at mid-portion of right renal artery. Distal half of renal artery is diffusely narrowed. Note progressive narrowing of left main renal artery with high-grade stenosis of mid-portion and post-stenotic dilatation, probably aneurysmal, of distal half of artery. Histologic examination of right renal artery and branches proved lesion to be intimal fibrous stenosis. *d* (case 22). Percutaneous retrograde aortorenal arteriogram illustrating almost total occlusion of proximal and middle thirds of right main renal artery. Threadlike lumen of proximal two thirds gradually assumes more normal appearance in distal third. Histologic examination revealed lesion to be periarterial fibrous stenosis.

Comment

Renal hypertension may be caused by perinephric, parenchymal, or arterial lesions, either extrinsic or intrinsic, which are the clinical counterparts of the experimental hypertension of cellophane perinephritis, of nephrotoxic serum nephritis, and of narrowing of the renal artery by the application of clips or clamps. Pertinent to this discussion are intrinsic stenosing or occlusive lesions of renal arteries. Intrinsic lesions that may cause renal artery stenosis include atherosclerotic plaques—the most common cause—which are usually located in the proximal third or at the aortic orifice of the renal artery, and the idiopathic fibrous and fibromuscular occlusive lesions which usually involve the distal two-thirds of the artery and its branches. These are being detected and

reported with increasing frequency because of more intensive diagnostic study of hypertensive patients for evidence of renal or renal artery lesions. Less frequently reported intrinsic lesions have included primary thrombosis, emboli, and renal arteritides of the necrotizing, syphilitic, and Takayashu types. In addition, vascular anomalies—including congenital hypoplasia—and aneurysms of congenital, traumatic, mycotic, dissecting, and arteriovenous varieties may be found. A number of instances of hypertension associated with renal abnormalities have also been seen in Marfan's syndrome, although the renal arterial lesions were not described.

In a study of 51 pathologic renal arteries that were surgically removed, McCormack describes six groups of stenotic or completely occlusive lesions: (1) Atherosclerotic lesions were seen in 19 renal arteries either as a concentric zone of atheroma or as an eccentric plaque. (2) Stenotic lesions due to mural fibrosis of the artery were encountered in 12 arteries and showed destruction of the external elastica with a fibrous ring involving the outer third of the media and adventitia. (3) Idiopathic thrombosis was found in 7 arteries. (4) Segmental muscular and fibromuscular hyperplasia occurred in 7 arteries, and 2 of these had an associated dissecting aneurysm. (5) Dissecting aneurysm of the renal artery was found in two cases. (6) Idiopathic stenosis of the renal artery was encountered in four cases and appeared as fibrous intimal thickening with a tortuous internal elastic lamina. More recently, based on further experience, McCormack described "subadventitial fibrosis" which affects particularly the outer portion of the media, and "transmural fibrosis" involving the entire wall.

Although these idiopathic occlusive and stenosing fibrous or fibromuscular lesions are nonatherosclerotic, as pointed out in the literature, the morphology in individual cases may vary considerably; furthermore, the picture may be complicated by the finding of secondary thrombosis, poststenotic dilatation, and single, multiple, or dissecting aneurysms. In the cases of renal artery stenosis in the present series, the authors' findings have been rather similar to those previously reported. For the preliminary analysis of their material they have retained a broad classification of either fibrous (intimal or periarterial) or fibromuscular (medial) stenosis of the renal arteries. Since these lesions are located predominantly in the middle or distal third of the artery, and since they frequently involve its branches and often occur bilaterally, they present major surgical obstacles in many cases. Aberrant arteries may also be affected, as demonstrated in several of their cases.

In general, the fibromuscular stenosing processes encountered by the authors were characterized by an unusual thickening of the media by loose, often

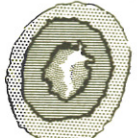

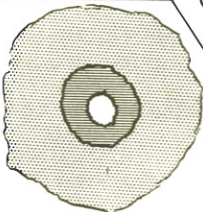
TABLE 2
Operative Results in 19 Patients With Fibrous or Fibromuscular Stenotic Lesions of Renal Arteries*

Operation	Patients	Normotensive	Improved	Unchanged
Nephrectomy	11	9	2	0
Arterial repair	3	2	1	0
Arterial bypass				
Spleno-renal	2	0	2	0
Aorto-renal	1	1	0	0
Heminephrectomy	1	0	1	0
Exploration only	1	0	0	1
Total	19	12	6	1

* These patients were operated on 6 months ago or longer; patients 22 and 23, who underwent operation less than 6 months ago, are therefore not included in this tabulation.

myxomatous-appearing fibrous tissue which separated and distorted smooth muscle fibers. The stenosing lesions were associated with extensive degenerative and disruptive changes in elastic tissue and smooth muscle. In the majority of cases these effects were more pronounced in the inner half to two-thirds of

FIGURE 2

Lesion predominately	Types	
Intimal		INTIMAL FIBROUS STENOSIS
Medial		(MEDIAL) FIBRO-MUSCULAR STENOSIS (Fibromuscular hyperplasia)
Adventitial and periarterial		(a) Focal or tubular (b) With multiple microaneurysms "String of beads" (c) With dissecting aneurysm, (d) Other PERIARTERIAL FIBROUS STENOSIS

Classification of fibrous and fibromuscular stenosis of renal artery.

the vessel wall and at times also involved the intima, although to a lesser degree, especially when the internal elastic lamina was disrupted. Indeed, abnormalities of elastic tissue may be the primary alteration in this process. In particular, the internal elastic lamina is involved and may show extensive layering, fraying, irregular thickening, and focal or total loss. Similar but lesser changes are seen in the elastic fibers of the media and, usually to a still lesser degree, in the external elastic lamina. There may be an associated focal increase in the quantity of ground substance, particularly in zones of elastic tissue damage which shows positive metachromatic staining.

A similar substance has been described in the aorta and is considered to be acid mucopolysaccharide. This substance, the amount of which varies with age, often fills pathologic defects in the vessel, particularly when there is destruction of elastic tissue or smooth muscle. Hamilton has compared the findings of fibromuscular stenosis to those in Erdheim's medial necrosis of the aorta with local modifications. Thus, not only occlusive but also disruptive lesions of the renal arteries are seen in this condition, including dissecting aneurysms or multiple microaneurysms which are probably the result of extensive elastic tissue damage. There are important individual differences in the gross and microscopic findings in various cases included among fibrous and

fibromuscular stenosing lesions of the renal arteries. The case reported by Leadbetter and Burkland is unique and apparently represents a true congenital anomaly. In the pelvic kidney removed from their five and one-half-year old male patient, the renal artery was practically occluded by a plug of smooth muscle which had an elastica; however, the vessel also had a defect in the media and in the internal and external elastic laminae.

Either localized or tubular fibromuscular stenosis may be seen as in the case described by Yendt and associates. In the right renal artery of a 27-year old woman there was tubular narrowing of the lumen for a distance of 3 cm; in addition, localized constriction was found on the left side. Similar tubular narrowing of the lumen was present in one of the authors' patients in addition to certain other features mentioned above.

Probably the most striking type of lesion has been the corrugation on the internal surface of the renal artery (such as in case 2 described by the writers) due to alternating fibromuscular thickening and zones of deficiency in the media and elastic tissue. Arteriographically, these changes bestow the characteristic "string of beads" appearance, and on histologic study of longitudinal tissue sections they may be seen as transverse zones of deficiency of the media or multiple microaneurysms with intervening occlusive fibromuscular rings. Unless external bulging of the wall is present, such internal aneurysms may be apparent to the surgeon only as thick and then thin segmentations of the artery through which blood may be seen. Certain reported cases of fibromuscular hyperplasia of the renal artery or aneurysms associated with hypertension belong to this category.

Occlusive lesions may consist primarily of intimal fibrous proliferations, such as in the cases reported by Dawson and Nabarro, two cases of Poutasse and Dustan, four of McCormack's series, and several in the present series. Cushions of rather loose fibrous tissue obstruct the arterial lumen and may also involve one or all hilar branches. The internal elastic lamina usually shows duplication and fragmentation, although the media is intact. In several patients in this series with fibromuscular lesions in the main renal artery, slight fibrous proliferations in the intima of the main artery or of a hilar branch were also present. However, the relationship between these two processes—fibrous (intimal) and fibromuscular (medial)—has not been established. Admittedly, one cannot be sure that intimal fibrous stenosis is not secondary to some other process, for example, healed arteritis as suggested by McCormack.

Dahl and associates produced small intimal fibrous lesions by removing the adventitia of the external iliac arteries of dogs. These were attributed to surgical trauma, and it was pointed out that such a proliferation of intimal connective tissue may occur over tears in the inner elastic membrane and over traumatic lesions of the media. In the renal parenchyma, intimal fibrous proliferation in interlobar, arcuate, and interlobular arteries may frequently be seen in benign nephrosclerosis of essential hypertension, in chronic pyelonephritis associated with hypertension, and in large and medium sized renal arteries in patients with malignant nephrosclerosis treated with antihypertensive drugs. Intimal fibrous stenosis has reportedly involved other visceral arteries

in cases in which it produced bilateral renal artery stenosis. A puzzling feature of the fibromuscular lesions has been their apparent localization in the renal arteries.

Periarterial fibrous stenosis of the renal artery, although infrequent, is apparently a distinct morphologic entity with a characteristic fibrous thickening in the nature of an inflammatory reaction, involving predominantly the adventitia and periarterial tissues. The collagenous reaction and focal lymphocytic and plasma cell infiltration in one case herein reported is reminiscent of a rather similar tissue reaction seen in cases of periureteral, retroperitoneal or mediastinal fibrosis (fibrous retroperitonitis; fibrous mediastinitis). Such a reaction, as described by Reed and Stinely, produces massive periaortic and periarterial (coronary and iliac) fibrosis. In such circumstances, the ureters, blood vessels, and lymph nodes may be surrounded by the fibrotic tissue but are usually not obliterated.

Among the etiologic factors considered are fibromatoses, trauma, inflammation, syphilis, hypersensitivity disorders, rheumatic fever, and an exaggerated reparative reaction to inflammation. Manion has studied the vasa vasorum of the aorta and its branches, including the renal arteries, in cases of "sclerosing aortitis" and "sclerosing arteritis." He believes that obliterative changes in the vasa vasorum are important in the development of structural alterations seen in the arterial wall.

Most of the kidneys and material from renal biopsies in the present series showed varying degrees of tubular atrophy which is thought to have been due to ischemia; in five cases, large zones of infarction had resulted. Such findings have been reported previously to be a hallmark of renal ischemia of a variety of causes. It is well accepted that stenosis of a renal artery may protect a kidney from parenchymal and vascular damage due to the severe hypertension; however, untreated progressive renal ischemia may eventually lay waste to the kidney as a result of parenchymal infarction and fibrosis of devitalized zones. Control of blood pressure elevation by medical antihypertensive regimens should not be expected to result in increased blood flow to the kidney made ischemic because of renal artery stenosis.

Concerning etiology, there is general agreement that these idiopathic fibrous and fibromuscular stenosing lesions apparently do not resemble atherosclerosis, although the latter may at times be a superimposed process. Some suggested etiologic factors in fibromuscular stenosis are congenital anomalies, intrinsic defects in elastic tissue, Erdheim's medial necrosis, healed arteritis, hemorrhage and thrombosis, and abnormal stretching of arteries—especially in pregnancy. Although the authors have no firm convictions concerning the cause of fibromuscular stenosis, they state that it should be considered that the striking degeneration of elastic tissues may precede the unusual fibromuscular thickening of the arterial wall and allow subsequent disruptive lesions such as multiple microaneurysms. This would suggest a possible basic abnormality of elastic tissue and resultant fibromuscular dysplasia, rather than hyperplasia, affecting the renal arteries.

The authors were impressed by the frequent occurrence of this unusual disorder in young women in whom the disease process is apparently limited to

the renal arteries. Additional surgical and necropsy material is needed to permit definition of the scope of this problem and perhaps to provide some clues concerning pathogenesis. It is possible that intimal or periarterial fibrous proliferation may represent unusual healing processes following various types of vascular injury. In addition, the extent of these anatomic changes may in some way be related to the duration and severity of the hypertension.

Summary

The report continues: "We have reviewed some of our experience with an unusual disorder—idiopathic fibrous and fibromuscular stenoses of the renal arteries—occurring in 23 patients with hypertension. The clinical evaluation, special investigative studies, surgical procedures, and pathologic findings have been presented, and the following highlights may be cited by way of summary:

Clinical. In a generally variable clinical picture which largely reflected elevated blood pressure, the finding of an abdominal bruit—characteristically of high frequency and usually continuous with accentuation in systole—provided one of the most helpful clues in diagnosis of this condition. Attention is called to the frequency of this disease in young women.

Special Studies. The emphasis in this paper was on arteriography which revealed in the majority of patients a picture of multiple areas of concentric narrowing of the renal artery with intervening areas of normal or dilated artery, producing a characteristic 'string of beads' appearance. A striking negative finding was the absence of any significant atheromatous disease of the abdominal aorta. Isotope renograms and separated renal function studies also have proved invaluable in the investigation of this condition, and excretory urography was contributory.

Surgical. The procedures in 19 patients who were operated on 6 months ago or longer were nephrectomy (11), arterial repair (3), arterial bypass (3), and heminephrectomy (1); one patient underwent exploration only. Results were encouraging, 12 patients becoming normotensive and 6 much improved; one patient (exploration only) remains hypertensive.

Pathologic. Lesions in the arteries and, in some instances, changes in the kidneys are described in some detail. A broad classification of either fibrous (intimal or periarterial) or fibromuscular (medial) stenosis of the renal arteries is outlined. Perhaps the most striking finding in the vessels was the corrugation on the internal surface of the renal artery due to alternating fibromuscular thickening and zones of deficiency in the media and elastic tissue (multiple microaneurysms). These changes were responsible for the characteristic 'string of beads' appearance of the vessels on arteriograms."

* * * * *

Abdominal Surgery Without Gastrointestinal Suction

Irving F. Stein Jr, and Hyman S. Lans. Quart Bull Northw Univ Med Sch, 35:352, 1961.

Gastrointestinal suction has been routinely used for many years for all types of abdominal surgery and is instituted to prevent postoperative distention or to prevent further distention in cases of intestinal obstruction, ileus, or peritonitis. Experience shows that less distention occurs if there is no intestinal suction. Studies of the return of air and fluid in postoperative patients with Levin tubes indicate that if the patient is allowed no fluid by mouth an average of 1600 cc of air is recovered in 24 hours. When fluid is freely allowed almost 5 liters of air are recovered in individuals who drink 200 cc in 24 hours. The presence of a tube in the nose and throat causes repeated swallowing motions which carry air to the stomach. If the suction is not effective—as is frequently the case—this air will progress into the intestinal tract and remain there until peristalsis is sufficient to push it through. Without nasogastric suction or bowel resections, peritonitis, ileus, or obstruction are treated postoperatively without suction. These patients are given nothing by mouth until they are passing gas freely. By severely limiting food for a few days there is minimal abdominal distention and minimal gas pains.

Preoperative use of suction is reserved for patients in whom vomiting is likely during anesthesia and includes patients with bowel obstruction and those with marked preoperative abdominal distention. The tube is removed as soon as the patient is awake. Patients with perforated peptic ulcer are the only ones treated routinely with preoperative and postoperative suction. A preoperative tube is also used in many cases of massive upper gastrointestinal bleeding and in abdominal trauma. The tube may be of diagnostic value and is usually removed after operation.

(Reviewed by James H. Holman. Surg Gynec Obstet 114:575, June 1962)

* * * * *

Tranquillizers*

M. Weatherall MA DM BSc. Department of Pharmacology, London Hospital Medical College. Brit Med J 5287:1219, May 5, 1962.

"The term 'tranquillizer' appears to have become widely used rather less than ten years ago. The number of drugs to which the term has been applied is quite large, so much so that recently a new agent has been advertised as 'the successor to the 35 tranquillizers.' This number is probably correct, at least in order of magnitude, and suggests that either a considerable degree of accuracy is necessary in diagnosis to distinguish each of the conditions for which a different tranquillizer is necessary, or that more drugs have been put on the market than are therapeutically necessary. Some review of the evidence about

therapeutic indications and efficacy of tranquillizers is therefore essential as a preliminary to considering their proper use.

Unfortunately, a very large proportion of the published clinical reports on the use of tranquillizers are inadequate when subjected to even mildly critical scrutiny, and are consequently not useful as a firm foundation for knowledge in this field. Two studies (Foulds, 1958; Fox, 1961) have recently been made of published reports on various forms of therapy in psychiatric treatment. Both studies drew on the principal journals in Great Britain and America where such reports are published and where the standards of acceptability are likely to be high. In both studies the presence or absence of certain procedures in investigation were noted, such as the use of controls, the use of quantitative methods of estimating the patients' progress, and the use of statistical procedures for evaluating results; in both studies it was also observed whether the treatments used were claimed to be successful or not. As Fox points out, the term 'successful' requires careful definition in this context, and Foulds's and Fox's definition are not quite the same, but the results of both studies are similar and most important.

A much higher proportion of 'successes' was reported in papers in which the use of control procedures was not mentioned. The observed differences are much too large to be due to the chances of sampling. Nor are they due to different drugs being used in the controlled and uncontrolled trials. Fox showed that there was no obvious difference in this respect between controlled and uncontrolled trials. Clearly, the practice of making controlled observations is not immediately conducive to discovering successful methods of therapy, and it is necessary to consider why this is so. Anyone who is familiar with the vagaries of experimentation, even in the rigidly controlled conditions of a laboratory, will unhesitatingly put forward one explanation—that irrelevant factors have entered into the uncontrolled trials and have produced a crop of false-positive results. One might add that it is not even necessary to explain why the false-positive results predominate; notably unsuccessful trials are much less likely to be published than apparently successful ones. A practicing clinician, on the other hand, might suggest that the conditions of a properly controlled therapeutic trial are appreciably remote from those in which disease is ordinarily treated, and that it might well be difficult for any remedy to work in the depressing atmosphere of scientifically regimented procedure. The argument that miracles are inhibited by the normal methods of intellectual inquiry has never had much appeal to the scientifically minded, but as will be seen, both points of view have a certain amount of evidence in their support.

There is no doubt that other factors besides the drug used influence the outcome of treatment. In the last fifteen years, controlled trials in which some patients receive a drug and others receive an indistinguishable dummy have become common, and in such trials, particularly when symptomatic changes have been studied, it is exceptional for improvement not to be reported among patients treated with dummy tablets. The lack of success in controlled trials does not mean that the patients did not improve. It means only that the patients who received the control or dummy procedure improved equally with those who received the drug, and that the elementary scientific precaution of making the

controlled observations prevented the inappropriate crediting of a particular drug with properties which it did not possess.

It is not necessary to neglect an improvement of this sort simply because it occurs with a dummy procedure as well as with a drug. The response to inert medications or placebos has been studied extensively in recent years (Wolf, 1950; Beecher, 1955; Loranger, Prout, and White, 1961), and it is clear that observed improvements are not simply due to the natural course of the disorder being treated. Individuals vary in the extent to which they react to placebos, both from a therapeutic point of view (Beecher, Keats, Mosteller, and Lasagna, 1953), and from the aspect of developing symptoms when treated with dummy preparations (Joyce, 1959), and the magnitude of the placebo reaction depends greatly on the circumstance in which it is elicited (Beecher, 1956). It is perhaps usefully regarded as a special case of the phenomenon, well known to psychologists, that within limits, any change will produce an improvement in human well-being and behaviour: the classical example being a series of experiments in which work conditions were varied with a view to increasing production in a factory and each change was beneficial, including the final one which involved reverting to the original conditions (Whitehead, 1938). So it is just as well to remember that the administration of any drug whatever is likely to benefit symptoms, provided the dose is not excessive, and to take advantage of the fact therapeutically without forgetting its significance in scientific scepticism.

Toxicity of Tranquillizers

Whether or not tranquillizers exert more benefit than dummy medication, it is important to know what ill effects they may have. These ill effects may be psychological and physiological. Physiological ill effects are generally rather unusual occurrences which become recognized only after months or years of use; they appear sooner or later for practically every drug, and it is irresponsible to maintain that any drug is non-toxic until it has been used for at least five years. The recent example of thalidomide is very instructive in this respect (Fullerton and Kremer, 1961; Hayman, 1961a, 1961b).

Psychological ill effects are likely to be of two kinds. One is impairment of normal skills which can be detected to some extent by a variety of laboratory tests. The other is impairment of interpersonal relationships which is a kind of effect which has hardly been studied at all. Patients who seek medical aid because they lack tranquillity generally have also some difficulties with other people. We know very little about these difficulties and how they progress during treatment. The patients' own reports are liable to much bias, and it is difficult to know accurately what occurs in patients' homes. How domestic behaviour may be modified by drugs is uncertain, but there are occasional reminders of its importance, such as a report of uncontrolled rage promptly after starting treatment with chlordiazepoxide (methaminodiazepoxide; "librium") (Ingram and Timbury, 1960). The problems of variable aggressiveness under the influence of and during recovery from drugs are largely unstudied because of the extreme difficulty of making observations in circumstances where

the aggressiveness of the subject has its normal range, and until they are studied they certainly cannot be dismissed as unimportant.

So far as psychomotor tests go, all, on the whole, show impairment of performance with moderate doses of tranquilizers. The various studies of Kornetsky and colleagues are particularly valuable because they are comparative and because drugs are tested at more than one level of dosage. They show clearly that, weight for weight, chlorpromazine impairs performance in various tests more than does quinalbarbitone ("seconal"), though the most intellectual skills tested were more impaired by the barbiturate (Kornetsky and Humphries, 1958), and on chronic administration to schizophrenics no impairment by chlorpromazine was detectable (Kornetsky et al, 1959). Meproamate has also been subject to a variety of psychomotor tests, again with evidence of impaired skill on doses in the therapeutically effective range. But the most revealing aspect is the number of tranquillizers which are not included and on which no evidence appears to be available.

The principal physical ill effects of tranquillizers depend on the particular drug. The phenothiazines are apt to cause jaundice, agranulocytosis, and Parkinsonism. No comparative studies give much confidence for regarding one as less toxic than the others, though Parkinsonism appears to be particularly common with the piperazine derivatives, such as prochlorperazine (stemetil) (Dransfield, 1958) and trifluoperazine (stelazine) (Ayd, 1961). The overall incidence of Parkinsonism has been estimated as about 15%, (Ayd, 1961), but this is based on American usage where the normal dose is nearly three times that used in Britain (Heilizer, 1960). Jaundice occurs in between 1 and 10% of patients and agranulocytosis in 0.2 - 0.5% (Raskin, 1957). The barbiturates have been used for much longer than the phenothiazines, and in view of their very extensive use are unlikely to be found to have more untoward effects than those already known (Weatherall, 1957). Reserpine is apt to cause suicidal depression.

All drugs depressing the central nervous system are liable to two additional ill effects from misuse, addiction and suicide. It is difficult to assess the magnitude of either risk. Addiction, or at least habituation, is well known after barbiturates (Isbell, Altschul, Kornetsky, Eisenman, Flanary, and Fraser, 1950) and has been reported after meproamate (Lemere, 1956) and glutethimide (Rogers, 1958; Sadwin and Glen, 1958; Lloyd and Clark, 1959): the extent to which it is liable to occur probably depends more on the patient than on the drug with these relatively mild depressants. Suicide with barbiturates is common, but the treatment of barbiturate poisoning is generally successful and it seems likely that the majority of patients who attempt suicide in this way, or probably with other central depressants, are unsuccessful.

Conclusions

In spite of much enthusiasm and propaganda, tranquillizing drugs have very limited effects. Perhaps their greatest value has been in just that enthusiasm which they aroused. Certainly their use has been followed by much reduction in the number of in-patients in mental hospitals (Brill and Patton, 1957, 1959),

but this improvement is not uniquely attributable to the use of new drugs. The load of neurotic and anxious patients at a general practitioner's surgery does not seem to have been reduced so notably, nor is this surprising when the evidence from well conducted clinical trials is examined. In such trials, in anxious patients the most successful, if not the only successful, drugs are barbiturates. They are clearly effective and, unlike all the newer drugs, their toxicity is not gross and is well known."

* A British Medical Association Lecture given to the Scarborough Division on December 14, 1961.

NOTE: In addition to the above factors, the author discusses "Faults in Controlled Observations," "The Doctor and the Drug," "Classification of Tranquillizers," and "Tested Tranquillizers."—Editor

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MISCELLANY

Honors for Admiral Brown

In recognition of his "able leadership in the field of medicine," Rear Admiral Robert B. Brown MC USN, Commanding Officer of the National Naval Medical Center, Bethesda, Md., received an honorary Doctor of Science degree from Allegheny College, Meadville, Penna., on 4 June 1962.

Admiral Brown was graduated from Allegheny College in 1929, and from the University of Pennsylvania Medical School in 1933. He served his internship and Surgical Fellowships at the University of Pennsylvania Hospital. Following this he was an Instructor in Surgery and later an Associate in Surgery at the University of Pennsylvania. He received his Doctor of Science degree from the University of Pennsylvania Graduate School of Medicine in 1941.

Admiral Brown entered the U. S. Navy in 1942 and has served at various naval hospitals throughout the United States and on board the Navy Hospital Ships USS SOLACE, USS TRANQUILLITY and USS REPOSE. He assumed command of the Naval Hospital at the Medical Center in March 1960, and in February of this year assumed command of the National Naval Medical Center.

He has been the Navy Member of the Surgery Study Section at the National Institutes of Health, Bethesda, Md., since 1951. In addition, he is a Navy member on the Board of Governors and on the Graduate Training Committee, both of the American College of Surgeons; a Clinical (Adjunct) Professor of Surgery, Georgetown University School of Medicine, Washington, D. C., and is a member of a number of professional and honorary societies and associations.

—PIO, NNMC, Bethesda, Md.

Army and Air Force Courses

Army Courses. (1) Combined Medical Surgical Thoracic Seminar, Fitzsimons General Hospital, 24-28 September 1962, MC, DC. Deadline to apply, 15 July 1962. (2) Introduction to Research Methods, Armed Forces Institute of Pathology, 6-10 May 1963, MC. Deadline to apply, 25 February 1963.

Course #1 is a combination of the "Seminar on Cardiovascular and Thoracic Surgery" and "Symposium on Pulmonary Diseases."

Air Force Course. (1) Lectures in Aerospace Medicine, USAF School of Aerospace Medicine, USAF Aerospace Medical Center, Brooks Air Force Base, Texas, 4-8 February 1963. Deadline to apply, 1 December 1962.

Prerequisites for attendance at Lectures in Aerospace Medicine: Physicians and scientists concerned with the problems of space medicine are eligible for this course. SECRET security clearance is required on all candidates approved for attendance. Only a limited number of officers can be authorized to attend these courses on travel and per diem orders chargeable against Bureau of Medicine and Surgery funds. However, eligible officers who cannot be provided with travel orders to attend at Navy expense may be issued Authorization Orders by their Commanding Officers following confirmation by this Bureau that space is available in each case. Requests should be forwarded in accordance with BUMED INSTRUCTION 1520.8 (for Medical officers) and the Manual of the Medical Department 6-130 (for Dental officers) to meet deadline dates indicated above. (ProfDiv, BuMed)

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Announcement of National Bilirubin Survey

The Surgeon General, Rear Admiral E. C. Kenney MC USN has received the following information from D. A. Nickerson MD, President, College of American Pathologists:

"Because bilirubin measurements are of great importance in making therapeutic decisions, the College of American Pathologists is conducting a national survey of techniques and results of bilirubin determinations throughout the United States.

An invitation to participate will be mailed during July 1962 to the Laboratory Directors of all hospitals in the United States and Directors of Private Laboratories. An announcement will be distributed with the invitation.

Any of your members who wish to participate may do so by requesting an application form from the College of American Pathologists, 2115 Prudential Plaza, Chicago 1, Ill. We would appreciate your bringing this survey to the attention of your members."

Parasitological Studies in the Philippines

By invitation of the Secretary of Health, Republic of the Philippines, personnel of the Parasitology Department of the U. S. Naval Medical Research Unit No. 2 made field investigations in Palawan, Western Philippines. A group of five Chinese technicians and CDR Robert E. Kuntz MSC USN flew to Palawan and spent approximately three weeks in the field.

Activities of the NAMRU group were coordinated with those of local health authorities for a study of the intestinal parasites of man in the Puerto Princesa area, and with Professor D. S. Rabor, leader of Silliman University-Bishop Museum Expedition to Palawan. The latter group, consisting of twenty-five investigators and technicians, collected hundreds of animals which were made available to the NAMRU group for parasite examination. Production line technics allowed collection of several categories of ecto- and endoparasites which have been processed and forwarded to various NAMRU and Bishop Museum (Honolulu) coinvestigators.

Collections of endoparasites by the NAMRU group will allow a better understanding of zoogeographic relationships of hosts and parasites, and add much information and data which may be used for comparative purposes in NAMRU's study of parasites in Taiwan and Southeast Asia. A study of stool specimens from peoples of Palawan will allow a cursory evaluation of the intestinal parasites of man in an area where such studies have not been made previously.

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NBS Cooperates in Fallout Shelter Evaluation Program

The National Bureau of Standards is participating in an Office of Civil Defense program to assess the value of large buildings as fallout shelters. This nationwide survey will identify not only those buildings or parts of buildings that can serve as fallout shelters as they stand, but also those which through some modification can be rendered suitable for this purpose. The survey is expected to be completed some time this year, and will help to identify those geographic areas in which sufficient shelter space exists, as well as those in which there is a need for more shelter. Other government agencies assisting in the survey are Census Bureau, Army Corps of Engineers, and the Navy Bureau of Yards and Docks.

NBS involvement in the program is twofold. The Bureau's radiation theory laboratory, under the direction of Lewis V. Spencer, developed mathematical procedures and theoretical data necessary for estimating the protection factors (1) of a wide variety of buildings (2). These procedures are being used by the computation laboratory, headed by D. I. Mittleman, to convert field data on actual structures to protection factors. Such a large scale program was considered appropriate in terms of economics or time only with the use of high-speed electronic data processing.

Data on an estimated several hundred thousand buildings across the nation, covering such variables as room size, wall composition and thickness, number of floors, and others, are being collected by qualified architects and engineers. The detailed information on each building is entered on a large standard form, developed by the Census Bureau in close cooperation with the Office of Civil Defense, Department of Defense, and the Corps of Engineers, U. S. Army. The completed form for each building is sent to the Census Bureau where it is microfilmed. Then, with FOSDIC (film optical sensing device for input to computers) (3), the data are transferred to magnetic tape for input to the NBS computer.

At NBS, the data are first edited for errors and consistency and then processed by a computer. A protection factor is derived for each story of every building. Modifications of the input program have reduced the computational time for each story of a building from the original value of 4 seconds to 0.05 second. The completed data for each building within a geographic district are printed out as a unit. Then it becomes the task of the Army Corps of Engineers or the Navy Bureau of Yards and Docks—depending on which has responsibility in a particular area—to identify usable shelters. As the program progresses, local Civil Defense Offices will provide each shelter with supplies sufficient to sustain the number of persons sheltered for a specified time.

- (1) The protection factor is defined as the ratio of the detector response in a standard position outside the building to that within the building.
- (2) Structure shielding against fallout radiation from nuclear weapons, NBS Monograph 42, available from the Superintendent of Documents, U. S. Government Printing Office, Washington 25, D. C., 75 cents. See also Structure Shielding Against Fallout Radiation, NBS Technical News Bulletin 46 (June 1962).
- (3) FOSDIC III to assist in 1960 census, NBS Technical News Bulletin 43, 106 (June 1959).

(From: Technical News, U. S. Dept of Commerce, National Bureau of Standards, Washington 25, D. C.)

NOTE: For further information, readers of the Medical News Letter are referred to publications (2) and (3) (supra) or to the NBS Office of Technical Information. —Editor

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BUMED INSTRUCTION 1520.3D

15 June 1962

Subj: Courses of instruction in Aviation Medicine or Submarine Medicine; application for

Purpose. To provide guidelines for the submission of individual applications for assignment to courses of instruction in Aviation Medicine or Submarine Medicine. BUMED Instruction 1520.3C is hereby canceled.

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From the Note Book

CAPT Arje Receives Appointment. The Executive Board of the American College of Obstetricians and Gynecologists recently voted to establish an Armed Forces Chapter to include all Fellows of the College on active duty with any of the Armed Forces.

CAPT Sidney L. Arje MC USN was appointed to serve as Chairman of this chapter. COL Edward A. Zimmerman MC USA, and LTCOL Kenneth N. Morese MC USAF were named Vice Chairman and Secretary-Treasurer, respectively. These officers are the current OB-GYN consultants to the Surgeons General of their services and comprise the Committee on Armed Forces Personnel which has assisted the Executive Board of the College in screening applications for Fellowship received from service personnel. In the future, such applications will be processed through the Armed Forces Chapter. The organization of the chapter will be completed at the Eleventh Annual Armed Forces Obstetrics and Gynecology Seminar at the U. S. Naval Hospital, Great Lakes, Ill., 22 - 25 October 1962. (Adapted from ACOG Newsletter, May 1962)

Armed Forces Orthopaedic Seminar. The Navy will act as host for the Fourth Annual Military Orthopaedic Seminar to be held at the U. S. Naval Hospital, Portsmouth, Va., 19 - 21 September 1962. Government quarters will be available, and it is anticipated that there will be government air transportation available from the West Coast via the Southwest. All Orthopaedic Surgeons and Orthopaedic Residents on active duty in the Armed Services are eligible to attend. Eligible and interested Navy Medical officers should forward requests to Chief, Bureau of Medicine and Surgery, via chain of command, in accordance with BuMedInst 1520.8 at least 8 weeks prior to commencement of the Seminar. Travel and per diem orders chargeable against Bureau funds will be authorized for attendance of selected officers and residents contingent on availability of funds. Further details, including information concerning the airlift, will be announced later. (ProfDiv, BuMed)

Patricia Has Done Well. The Science Fair Project, carried out by Miss Patricia Pick of the North Chicago High School under the preceptorship of LT Michael W. Rytel MC USNR in NAMRU-4, Great Lakes, Ill., and reported by the Navy Medical News Letter of 4 May 1962, page 21, has been selected for one of the first prizes at the statewide competition held at Springfield, Ill., on 11 May. This project was among the blue ribbon winners of local and regional science fairs, and thus earned the opportunity of participating in statewide competition. The contest, sponsored by the Junior Academy of Sciences, drew approximately 1000 top projects—all selected by regional administration—from the entire State of Illinois.

Salute to USNH, San Diego! CAPT H.A. Markowitz MC USN, Executive Officer, USNH San Diego, has supplied the following information which indicates commendable initiative and leadership by members of the hospital staff:

CAPT Robert M. Dimmette MC USN, Chief of Pathology Service, U. S. Naval Hospital, San Diego, Calif., has recently been appointed as the medical member of the Community Educational Resources Committee of the Department of Education, San Diego County. CAPT Dimmette has been associated with the Department of Education in the past year for the development of materials and visual aids for Science projects in the field of Medicine. Recent film strips and study guides have been developed for blood banking procedures in cooperation with LCDR B. Butterfield MSC USN, Officer in Charge of Blood Bank in the U. S. Naval Hospital, San Diego. Study sets of hematological abnormalities and human histology have been prepared by the Board of Education in cooperation with the laboratory facilities at the Naval Hospital. These have been distributed to classrooms through San Diego County and the State of California for use in physiology, biology, and health classes at high school and junior college level.

American Board Certifications

Certified as Diplomates - American Board of Anesthesiology

CDR Edward E. Parker MC USN

LCDR Robert J. Van Houten MC USN

American Board of Internal Medicine

LCDR Russell Miller Jr, MC USN

LCDR Harold R. Schumacher MC USN

LCDR Joseph E. Stitcher MC USN

LCDR Richard A. Wetzel MC USN

American Board of Obstetrics and Gynecology

CAPT R. F. C. MacPherson MC USN

CDR Paul P. McBride MC USNR

CDR Carter B. Sigel MC USN

LCDR James W. McDaniel MC USN

LCDR Edmund B. McMahon MC USN

LCDR P. R. Spierling Jr, MC USN

LCDR Billy D. Viele MC USN

American Board of Orthopaedic Surgery

LCDR Daniel J. Scott JR, MC USN

LCDR Henry J. Waive MC USNR

American Board of Psychiatry and Neurology

CDR Roger F. Reinhardt MC USN

LCDR Ransom J. Arthur MC USN

American Board of Surgery

LCDR Allen R. Botimer MC USN

LCDR Walter M. Johnson MC USN

American Board of Surgery (continued)

LCDR John F. McLeay MC USNR

LT P.J. Fisher Jr, MC USN

Certified as Diplomate - American Board of Preventive Medicine

(Occupational Medicine)

CDR John H. Schulte MC USN

Further Accomplishments by Medical Officers

CAPT James P. Semmens MC USN and LCDR James W. McDaniel MC USN have been elected as Fellows in the American College of Obstetricians and Gynecologists.

LCDR Stanley (n) Walzer MC USNR has been appointed as Assistant in Psychiatry at Harvard College.

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Naval Medical Research Reports

U. S. Naval Medical Research Institute, NNMC, Bethesda, Md.

1. Serum Protein and Calcium of Pigeons During the Reproductive Cycle
MR 005.06-0040.01 Report No. 1, July 1961.
2. Copolymers of Inosinic Acid with Cytidylic and Uridylic Acids
MR 005.06-0001.01 Report No. 16, November 1961.
3. Oxygen and Carbon Dioxide Permeability of Subcutaneous Gas Pockets
MR 005.14-3001.02 Report No. 1, January 1962.
4. Increased Resistance to Chloramphenicol in Rickettsia Prowazekii with
a Note on Failure to Demonstrate Genetic Interaction Among Strains
MR 005.09-1200.02 Report No. 7, February 1962.
5. Properties of Quinoxaline Oxide-Resistant Rickettsia Typhi
MR 005.09-1200.02 Report No. 8, February 1962.
6. Postirradiation Treatment of Lethal Body Irradiation by Cell-Free Spleen
Extract MR 005.08-1300.03 Report No. 8, March 1962.
7. Endocrine Pacemaker for Complete Heart Block MR 005.12-0001.03
Report No. 1, April 1962.

U. S. Naval Medical Field Research Laboratory, Camp Lejeune, N. C.

1. Influence of Wearing Body Armor of Different Designs, Materials, and
Weights on the Marksmanship of the Marine MR 005.12-7010.1.11,
March 1962.
2. Identification of an Abnormal Protein Fraction in Post-Burn Rat Plasma
MR 005.12-7020.1.1, March 1962.
3. User Test of Burners for FSN 6530-708-4490, Sterilizer, Surgical Dress-
ing, Pressure, Fuel Heated, Corrosion-Resisting Metal, 16x36 inches
MR 005.12-6001.6, March 1962.

DENTAL



SECTION

Use of Epinephrine in Local Anesthetics for Dental
Patients with Cardiovascular Disease: Review of the Literature

Sam V. Holroyd, Daniel T. Watts and John T. Welch, West Virginia University Medical Center. J Oral Surg 18: 492-503, November 1960. Year Book of Dentistry, 1961-1962 series, pp. 217-218.

Dentists have shown considerable concern about the possibility of untoward effects of epinephrine in local anesthetic solutions in cardiovascular patients. Many statements condemning the use of this agent in such patients have been made without sufficient clinical or experimental support.

Clinical studies have indicated that the epinephrine in anesthetic solutions is not responsible for systemic effects. Conversely, inadequate depth of anesthesia when epinephrine is not used results in an increase in pain, fear and apprehension and an increased release of endogenous epinephrine.

No fatalities resulting from use of epinephrine in local anesthetics have been reported, but deaths do occur from reactions to the anesthetic agents. One of the important functions of epinephrine in local anesthetic solutions is to localize the anesthetic agent and prevent systemic effects. The total dose of epinephrine used in dental procedures is much less than that needed to produce a positive pressor response and usually far less than that used for medical purposes.

Anesthetics with epinephrine are actually safer than those without it, provided proper technics, including aspiration, are used. Although the cardiovascular patient reacts more unfavorably to pain, fear and apprehension than does the normal patient, the systemic effects of anesthetic solutions with epinephrine do not significantly differ clinically in normal and cardiovascular patients. The increase in blood pressure and heart rate associated with dental procedures are primarily due to fear and apprehension, are more severe in cardiovascular patients, and are not augmented by injection of local anesthetic solutions with epinephrine.

The endogenous epinephrine secreted by the adrenal glands (as a result of apprehension and pain when the anesthesia is inadequate, owing to exclusion of the vasoconstrictor) far overshadows the amount of vasopressor in the anesthetic solution. The New York Heart Association reports that 0.2 mg epinephrine is the maximum total dosage for cardiac patients. This amount is equal to about 10 carpules (20 cc) of a solution containing 1:100,000 epinephrine.

Past and Present Concepts in Endodontics

Edgar D. Coolidge, Evanston, Illinois. JADA 61: 676-688, December 1960.
Year Book of Dentistry, Series 1961-1962, pp 28-29.

Endodontic treatment in the nineteenth century was largely a matter of trial and error. If the tooth was comfortable, treatment was considered a success. Caustic and protein-coagulating drugs were commonly used, but there is little evidence that dentists recognized the need for remedies that would penetrate beyond the infected surface of the pulp. The present theory of endodontics is one of a biologic approach with the selection of mild antiseptics, germicides or antibiotics for the specific control of all types of micro-organisms in the pulp chamber and canals.

Great stress is now placed on the importance of sterilization of instruments, isolation of the field of operation and the mechanical procedure of debridement and thorough cleaning of the canals. Bacteriologic culture to determine the sterility of the canal before filling is now regarded as essential. Any other physical means for testing for sterility is not dependable. Complete filling of the canal to the apical foramen, which should be sealed in the use of the measurement controlled technic, is the acceptable endodontic practice of today. The result is verified by x-ray. The success of treatment can be determined by interval x-rays taken until all pathosis around the root apex is resolved and a complete lamina dura can be traced around the root.

The problems involved in successful endodontic treatment are only partly solved and are not fully understood by investigators and clinicians. Much remains to be learned regarding the microbiology of the periapical tissues in teeth with vital pulps as well as those that are pulpless.

The European investigators are credited with finding and putting into practice the new theory in healing of exposed vital pulps. Many workers have now confirmed the healing power in pulp tissue and the pulp tolerance to calcium hydroxide and consider this the most dependable pulpcapping material available today. There has been considerable interest and research in the reactions of pulp tissue to the different operative technics and to the various filling materials. Information from this research is being applied for the conservation of the pulp in clinical practice.

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Hypnosis in Dentistry

Charles F. Bodecker, DDS, Professor Emeritus, Oral Histology, Columbia University, New York. J. South. California D. A., March 1962, pp. 69-71.

Hypnosis is a two-edged sword. With its aid, dental operations can be performed without pain, developing a deep sense of gratitude in the patient. On the other hand, it may also be dangerous, which advocates of hypnosis deny. It is

true that thousands of persons have been hypnotized as a source of entertainment on the variety stage without any apparent harm. But those who volunteer for such demonstrations have well-balanced personalities. The very fact that they are willing to make a spectacle of themselves shows that they have no fear.

On the other hand, the character of the dental patient selected for hypnosis is entirely different; he fears dental treatment, and for that very reason, hypnosis is applied. He is usually highstrung and most fearful of treatment. Such persons can suffer harm by being hypnotized, particularly if done by an improperly trained operator.

The September issue of the *Annals of Dentistry* presents a timely paper by Sandor Lorand on "Hypnotic Suggestion: Its Dynamics, Indications and Limitations." From this and other sources some material is quoted.

A knowledge of inducing hypnosis can be acquired in a few hours. This may be an important reason for its popularity. However, all who have a comprehensive training in this field know that the use of hypnosis with any degree of safety requires a university training of from 2 to 3 years in psychology, psychiatry and psychoanalysis. Without this background, the hypnotist may cause the subject to suffer "anxieties, panic, paranoid features and other manifestations... and bring about regression in the thinking, feeling and action sphere of the individual."

The literature on this subject indicates that hypnosis has a drastic psychologic effect and may bring about an abnormal relationship between subject and hypnotist. In this connection Freud, the first investigator to call attention to the true nature of hypnosis, stated, "It is to be found in the unconscious fixation of the libido on the person of the hypnotist." At a later date, Schilder restated the psychoanalytic concept, stressing the importance of the patient's masochistic attitude toward the hypnotist. Lorand summarizes in part, "Attention is drawn to some facts which are important to the psychodynamics of hypnotic suggestion. Fundamentally, such suggestions are based on the revival of the child's early dependency on his parents."

Four authors expressed their views in a consultant article on 18 questions. Light was thrown on the fact that the use of hypnosis can present real dangers, particularly if practiced by an improperly trained operator.

Borland and Epstein undertook a "study of the personality characteristics of the men who employ it (hypnosis) in their practices." In partial summation they state "that it may be concluded on the basis of this study that dentists who are well adjusted, who are relatively satisfied with themselves, and who obtain satisfaction from the conventional practice of their profession neither use hypnosis nor become interested in its use. It is as if they do not need such an additional and unusual source of gratification." Further, they state that "there is a place for hypnotism in dentistry in carefully selected instances. Our concern, like that of medicine, is for well trained, qualified dentists who have a knowledge of psychodynamics to use hypnosis only in performance of dental treatment, and who are qualified to recognize patients whose personality is such as to make them unsafe subjects for hypnosis."

All professional men strive for the complete confidence of their patients. They wish their advice to be followed implicitly and their judgment accepted without the slightest doubt by their patients.

Successful dentists achieve this end by gentle, considerate, but firm treatment of their patients. But not all dentists can establish this relationship, either because they do not make the effort or because of some lack in personality. To this group, hypnosis is the key to successfully influencing their patients. They know that by this means they may "overawe the patient." Further, hypnotic manipulations are "aimed at excluding critical thinking and appeal only to the emotions."

Under these conditions, should hypnosis in dentistry be encouraged? Is its use in dentistry necessary? Why not administer anesthesia instead? With local or general anesthesia all dental operations can be performed painlessly. It is true that some patients fear the needle prick and it is to the credit of those dentists who have taken up hypnosis that they strive to eliminate even this discomfort. However, considering the long university training necessary to use hypnosis safely, and its real dangers when practiced by improperly trained men, it seems that hypnosis by clinical dentists is inadvisable.

The policy of the Dental Division, Bureau of Medicine and Surgery in regard to the use of hypnosis by Naval Dental Officers was stated in the Medical News Letter, Vol. 39, No. 3, pages 24-25 of 2 February 1962.

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Personnel and Professional Notes

Reserve Dental Company Commanding Officer Gets Award. LCdr R. P. Robinson, DC, USNR, Commanding Officer, U. S. Naval Reserve Dental Company No. 7-17, Knoxville, Tennessee was named Tennessee's Outstanding Young Man. This honor goes annually to a young man between the ages of 21-35 who has contributed much of his time to his community. LCdr Robinson was named Knox County's Outstanding young man for the month of January 1962 and was chosen for the State award over nominees from other Tennessee cities.

Recent Diplomates of American Boards. The following officers have recently become Diplomates of the below-listed American Specialty Boards:

American Board of Oral Surgery

Cdr Philip J. Boyne, DC, USN

Cdr Howard B. Marble, Jr., DC, USN

Cdr Homer S. Samuels, DC, USN

Lcdr Harry J. Dennis, DC, USN

American Board of Periodontology

Cdr Theodore J. H. Rinck, DC, USN

Dental Corps Officers Presentations. The presentations listed below were recently given by the following officers:

- Capt A. R. Frechette DC USN, Commanding Officer, U. S. Naval Dental School - Panel Discussion on Prosthodontics and Registered Clinic "Partial Dentures" for New Jersey State Dental Society, Atlantic City, New Jersey
- Capt L. S. Hansen DC USN, Chief, Dental and Oral Division, Armed Forces Institute of Pathology - Lecture entitled "White Lesions of the Oral Mucosa" at Georgetown University, Washington, D. C.
- Capt F. M. Kyes DC USN, Director, Dental Activities 9th Naval District - Lecture entitled Mandibular Full Dentures for the Waukegan Dental Study Group, Waukegan, Illinois
- Capt F. L. Losee DC USN, Dental Research Officer, Dental Research Facility Division, Dental Dept. AdCom, U. S. Naval Training Center, Great Lakes - Lecture entitled "Trace Elements and Dental Caries" at the University of Illinois College of Dentistry
- Capt V. J. Niiranen DC USN, Force Dental Officer, Fleet Marine Force, Pacific - Mass Casualty Care in a Thermonuclear Age for American Stomatological Society of Japan, Camp Zama, Japan
- Capt Frank K. Etter DC USN, Staff Dental Officer, Commander Naval Forces Philippines - Paper, "Centric and Tentative Centric Relation" at the 54th Annual Meeting of the Philippine Dental Association.

Camp Lejeune Dental Society Ends Season. The last meeting of the season for the Camp Lejeune Dental Society was held on 23 May 1962 at the Paradise Point Officers Club. During the scientific portion of the meeting the following presentations were made:

- RAadm A. W. Chandler DC USN (Ret), former Assistant Chief of the Bureau of Medicine and Surgery (Dentistry) and Chief, Dental Division - "History of the Navy Dental Corps"
- Capt R. H. Loving DC USN, Diplomate, American Board of Periodontology, U. S. Naval Dental Clinic, Norfolk, Va. - "Periodontal Problems"
- Cdr G. H. Green DC USN, Resident in Oral Pathology, U. S. Naval Dental School, NNMC, Bethesda, Md. - "Oral Tetratology"

Capt Walsh Presents Film on Oral Surgery, Prosthetics and Operative Dentistry. Capt E. A. Walsh DC USN, Staff Dental Officer, Commander, U. S. Naval Forces, Europe, and the Dental Officers of the Dental Department of the U. S. Naval Support Activity and the Office of Naval Research, London, presented films on the subjects of oral surgery, prosthetics, and operative dentistry to 120 members of the British Dental Association and affiliated Societies at the American Embassy, London, on 7 May 1962.

Major General H. Quinlan, Q. H. D. S., Head of Dental Activities, Royal Army, was guest of honor

The presentation was followed by a discussion period and a reception.

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PREVENTIVE MEDICINE

A "Successful" Staphylococcal Control Program Which Failed

Drs. Jay P. Sanford, Robert E. Windom, Chester W. Fink, Richard A. Ferguson, and Anne L. Robinson, R.N. J Lab Clin Med 59(4):596, April 1962.

The recent epidemics of staphylococcal infection in neonatal and postpartum patients have been caused predominantly by "80/81" strains of staphylococci. Control of some epidemics has been achieved by transferring carriers of 80/81 staphylococci away from nurseries. In the spring of 1958, approximately 70% of neonatal and postpartum staphylococcal infections in our hospital were due to 80/81 staphylococci. A control program including surveillance of newborn infants and contact personnel by culture of the nasal vestibule for 80/81 staphylococci was instituted. Personnel harboring such strains were transferred. The rate of nasal colonization of infants with the 80/81 staphylococci fell from 10 to 30% to 2% by the spring of 1959. Simultaneously, the frequency of maternal breast abscesses decreased from 2% to virtually none. By June, 1959, the number of deliveries increased and a serious recrudescence of infections occurred. However, at this time there were no carriers of 80/81 staphylococci in the nursery and the rate of colonization of infants at discharge with this strain was less than 2%. Subsequently it was found that 65% of staphylococci isolated from neonatal pyoderma or maternal breast abscesses were a non-typable strain of staphylococcus, lysed by the HJD strain of 44A bacteriophage. Thus, even in the face of overcrowding and understaffing in the newborn nursery, a staphylococcal control program which was directed primarily at control of carriers of one type, the 80/81, succeeded in eliminating the strain. However, the 80/81 type was supplanted by another antibiotic-resistant strain of staphylococcus and the infection rate in neonatal and postpartum patients reached precontrol levels.

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The December 1961 issue of "Phoenix" is devoted to a history of schistosomiasis (bilharziasis) and to research directed at finding a vaccine or cure for this disease.

(US DHEW PHS Public Health Reports 77(5): 452, May 1962)

Smallpox in Bradford, 1962

John Douglas, DPH, Medical Officer of Health, Bradford, and William Edgar, MB, ChB, DPH, DCH, Deputy Medical Officer of Health, Bradford, England.
Brit Med J 5279:612-614, March 3, 1962.

The outbreak of smallpox in Bradford, England, came to light on Thursday, January 11, 1962, after the death of a patient, Case 1, in D 2 ward at St. Luke's Hospital. This patient had been admitted the previous day with a provisional diagnosis of thrombocytopenic purpura. His color on admission was described as similar to that of a cockscomb, so flushed were his face and extremities. There was no focal rash and he died within 24 hours of admission. Death was thought to be due to haemorrhagic smallpox.

This diagnosis was possible because a woman, Case 2, who had been under observation in Leeds Road Fever Hospital from January 10 as a probable case of haemorrhagic smallpox and who was employed as a cook at the Bradford Children's Hospital, had presented an identical clinical picture to Case 1. It then became obvious that five children, Cases 3, 4, 5, 6, and 7, in A 1 ward at the Bradford Children's Hospital (one of whom, Case 7, had been transferred to Wharfedale Children's Hospital) who had been under observation with spots from January 9-10 were also likely to be cases of smallpox.

A decision was taken on January 11, in consultation with the officers of the Leeds Regional Hospital Board, to quarantine the four hospitals concerned, i. e., Bradford Children's Hospital, St. Luke's Hospital, Leeds Road Fever Hospital, and Wharfedale Children's Hospital, and to vaccinate and place under surveillance all the staff and patients in the hospitals and to remove the suspected cases to Oakwell Isolation Hospital, Birstall.

On the following day, January 12, it became apparent that the source of the outbreak was almost certainly a 9-year-old Pakistani girl who arrived in this country by air from Karachi on December 16. She became ill and was admitted to the Bradford Children's Hospital on December 23 with malaria. This diagnosis was confirmed by a blood film which showed numerous Plasmodium vivax parasites, mostly in the ring stage. Antimalarial treatment reduced the temperature to normal and she remained afebrile until December 29, when her temperature rose again and she died the next day with nothing to suggest that the death was due to smallpox. Death was attributed to staphylococcal septicaemia, and Staphylococcus albus was recovered later from blood culture.

Because of the apparently long incubation period, a careful inquiry was necessary to eliminate a possible source of infection in this country. During the course of these inquiries it was found that a post-mortem examination had been performed at the Bradford Royal Infirmary, and thus a fifth hospital became involved in the outbreak. All staff of the hospital were vaccinated and the staff of the pathology department were placed under medical surveillance. In the case of the pathologist, Case 8, who performed the post-mortem examination, this was a primary vaccination performed on the eleventh day after

known contact, too late to prevent the onset of the illness. He was taken ill on the evening of January 12 and was removed to Oakwell Hospital the following day.

A nurse at Bradford Children's Hospital, Case 9, who had been removed for observation to Leeds Road Fever Hospital on January 11 was also regarded as a case of smallpox and transferred to Oakwell Hospital. On January 14 a child, Case 10, who had been in A 1 ward in cot 18 adjacent to Cases 3 to 7 at the same time as the Pakistani girl at the Bradford Children's Hospital and who had been discharged home on January 3 but kept under medical surveillance at home, was found to be pyrexial and to have a macular rash suspicious of smallpox, and was removed to Oakwell Hospital. This completes a total of 10 secondary cases (one occurring outside the city) from the original presumed source of infection--the Pakistani girl.

The recognition of 10 cases of smallpox within a period of 72 hours presented a grave picture, particularly as the spread of infection had already occurred in the following ways:

(a) Cases 3 to 6 had been exposed in A 1 ward in the infectious stage of smallpox from January 7 to 10, and the risk of infection to the other children in the ward, to the medical and nursing staff, relatives, and visitors was extremely high. Because of the movements of the nursing staff, infection had probably been conveyed to the other wards and departments. Many children had already been discharged home, and there was a further risk of dissemination both within and outside the hospital.

(b) Case 1 had attended work in the public abattoir on January 6 and 7 when he was known to be ill and presumably infectious. His job meant contact with numerous people in the abattoir.

(c) Case 8 attended a magistrates' court in the Town Hall on the morning of January 13, using public transport to and from the court. In addition, he called into a central post office and into one of the largest stores in the city before returning to the hospital.

Fortunately, the movements in the community of Cases 2 and 9 were much less, as they were resident members of the hospital staff.

The task of tracing, vaccinating, and placing under surveillance, with as little delay as possible, all the contacts was enormous.

The fact that many of these contacts had been exposed to the risk of infection as long as 6 days previously, with a consequent delay in vaccination, added greatly to the urgency of the task. At this stage one could confidently foresee at least 20-30 cases of smallpox occurring in the following weeks among people known to have been close contacts of the now confirmed cases at a time when these cases must have been infectious and they themselves unvaccinated. It is estimated that nearly 900 contacts were under surveillance in the city by the medical staff of the Health Department and hospitals during the outbreak.

Because of the large number of people involved--that is, patients, medical, nursing, and ancillary staffs, visitors, and contacts of the cases themselves during the infectious stage of their illness--it was felt that the

opportunities for the spread of infection in the city were considerable. While all known cases could be accounted for, what was uncertain was how many other people had been infected who were free to move about the city.

It is estimated that between Saturday, January 13, and Wednesday, January 17, approximately 250,000 were vaccinated in this city. This particular task was accomplished principally by medical and nursing staff from neighboring authorities and by medical practitioners in the city.

On January 13 all the available information concerning the outbreak, including a table showing the dates of onset of illness and appearance of rash of each known case, was sent to all physicians in the area and to adjacent medical officers of public health. A meeting was held on January 18, to which all surrounding medical health officers were invited, to inform them of the nature of the outbreak and of the system which had been adopted with regard to the surveillance of contacts and the special arrangements for the surveillance of hospital staff. This was greatly appreciated by them, and cleared many anxieties relating to "contacts" in their areas.

The mode of spread has not been established. The original case was an ill child who was unable to move out of her bed and none of the children in the cots were ambulant and able to contract infection by direct contact with the original case. Aerial spread is discounted as a result of subsequent smoke tests undertaken in the ward. No system of ward round as practiced by the medical or nursing staff would account for the occurrences. The children in the cots were either infants or children requiring considerably more nursing attention and care than children in the other beds in the ward. Infection may therefore have been carried by a member of the medical or nursing staff without her actually developing the disease, although Case 9 was on duty in the ward during the period December 28 to 30.

It has not proved possible to establish how Cases 1 and 2 were infected, since both died before the significance of their earlier movements could accurately be ascertained. While the cook was not in the habit of visiting the wards, it is known from relatives that she attended a New Year's party in the ward, and it seems possible that she may also have had some contact with the ward during the Christmas festive period, and thus had contact with the Pakistani child.

Case 1 attended the Bradford Children's Hospital with his wife on December 28, when his child was admitted to A 1 balcony. This does not necessitate entering the main ward itself, and his wife confirms that he did not do so on this occasion. As this was his only visit to the hospital prior to the death of the Pakistani child, he must presumably have been infected on this occasion.

The incubation period to the onset of symptoms in Case 1 and probably Case 2 also was therefore only 9 days. Neither of these cases had a focal eruption; one died 6 days after onset of symptoms, the other 7 days after. The incubation period for the remaining secondary cases was 9 to 14 days, assuming infection took place on December 28 or 29. In the case of the pathologist the date of infection can be fixed as January 1, the date of the post-mortem examination. This gives incubation period of 11 days. As none of the patients

were vaccinated until the eleventh or twelfth day, it can be assumed that vaccination had no material effect upon the incubation periods.

Cases 3 to 11 were admitted to Oakwell Hospital, and the consultant in charge was of the opinion that none showed any evidence of previous successful vaccination prior to the outbreak. Similarly, no satisfactory evidence is available that Cases 1 and 2 had had previous vaccination, although it seems probable that Case 1 had been vaccinated when he was stationed in the Middle East during the war.

This is in contrast to the vaccinal history of the Pakistani girl, who was vaccinated in infancy and revaccinated along with her mother and father on December 5, 1961. International vaccination certificates were inspected for all three (after the child's death) and the parents were examined by a member of the smallpox panel, who found on each parent scars of successful primary vaccination and recent similar scars consistent with successful revaccination. It would appear unreasonable to suggest that the certificate of the child, completed at the same time, was not valid. The father stated that the child's arm was red for a few days after revaccination, but that no crust or scar developed. It is more probable, therefore, that revaccination was not successful.

Of the two "third-generation" cases which occurred in D2 ward, both were successfully vaccinated within 24 hours of exposure, and, although this did not prevent their contracting the disease, it was in each case in a very mild form. It is possible that their advanced ages (63 and 77) and the associated serious medical conditions for which they were originally admitted to the hospital were responsible for some delay in the normal response to successful vaccination.

A further "third-generation" case occurred outside the city in a child in the same ward as Case 7 at Wharfedale Children's Hospital.

The death rate during this outbreak was particularly high. Out of a total of 12 cases of smallpox occurring in Bradford and a further 2 in the Wharfedale Children's Hospital, 6 died from the disease and one from other causes.

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Focal Nature of an Epidemic Disease

Dr. K. R. S. Morris, Department of Pathology, Makerere College, Kampala, Uganda. Nature 193: 1022-1024, March 17, 1962.

Although a focal distribution has been noted in many epidemic diseases, the ecological factors responsible for this characteristic are not always understood. An investigation of sleeping sickness has shown the vital role of foci in this endemo-epidemic disease, and this knowledge has provided a key to successful control.

Factors Influencing Distribution

The most widespread form of sleeping sickness, which occurs across Africa from Senegal to the Kenya shores of Lake Victoria, is caused by the protozoal

parasite, Trypanosoma gambiense, and transmitted by the tsetse flies Glossina palpalis and G. tachinoides. Although direct transmission is possible, in which the parasite is transferred directly from infected to healthy people through contamination of the tsetse's proboscis, transmission is usually cyclical. Trypanosomes ingested with the blood of a sufferer develop cyclically in the body of the tsetse and appear, after 18 days, in its salivary glands, after which that fly is probably infective for life.

Fortunately, neither process is as simple in the field as in the textbook. For direct transmission to take place, a profuse blood infection in the patient would be necessary for the tsetse's proboscis to be sufficiently contaminated, and heavy infection of T. gambiense is extremely rare. Secondly, the fly's first feed would have to be interrupted, so that, still hungry, it would recommence feeding on a healthy person probably within minutes, certainly within the hour, before the trypanosomes had lost their viability. The conditions are so exacting that it is doubtful if direct transmission ever takes place in nature. Cyclical transmission is almost as chance. Only a small proportion of tsetse flies feeding on a patient ever become infected. Wijers lists 5 conditions, all of which must be fulfilled for G. palpalis to become infected. Even when a fly is infected its bite is not invariably infective to man; the transmissibility of T. gambiense is very low. In brief, the transmission of infections from man to man is a difficult process, and only occurs when a very precise set of conditions is fulfilled. This is obvious when the limited extent of sleeping sickness is considered against the huge region of tropical Africa in which the populations are in contact with tsetse flies. Were transmission otherwise than difficult, either these populations would have been decimated long ago or the trypanosome would have developed into a more efficient parasite and, instead of killing its human hosts as at present, would be a more or less harmless commensal.

Two other factors exert a major influence on the distribution of Gambian sleeping sickness. The disease is prolonged and, in its early stages, mild. This may last for several years, during which time a sick person continues his normal activities, farming, fishing and hunting, travelling, which bring him in contact with thousands of tsetse while he is infective. In this way the infection is not only propagated locally but also can be spread widely along trade routes. Secondly, the vectors are riparian in distribution, their habitat is the evergreen vegetation fringing rivers and lake shores. Thus, waterways, essential to the life of African communities, become the danger spots should trypanosomiasis appear.

Zonation in Epidemics

In the 1930's sleeping sickness in West Africa had developed into huge epidemics; that which was studied by the author covered 30,000 square miles, extending from the upper Volta Rivers to the Niger west of Bamako. Within this region a pattern of zonation became apparent. Areas of heavy infection, from 5 to more than 15%, were surrounded by zones of lighter incidence, grading off

into infection-free country or with linear extensions along trade routes. These latter were very important, as along them further foci of high infection often arose.

The same pattern was observed, on a smaller scale, in several parts of East Africa. The West African investigations led to the conclusion that the central zones of high infection were primary epidemic foci, in which were combined a full complex of factors favorable to the rapid transmission of trypanosomiasis and therefore to the development of epidemics. The presence of the disease in the peripheral, secondary areas and along trade routes was dependent on the infiltration of infections from the primary foci, and, although local transmission of the disease was occurring, this would cease if the continual re-introduction of infections was cut off. The disease here, in other words, was below the critical level of Macdonald at which it was capable of maintaining itself. If this conclusion were correct, attack on the primary foci only brought to the point of eliminating the disease there, should result in its spontaneous disappearance in the secondary zones also. This is, in fact, what took place when this theory of focal attack was put into practice in the Gold Coast, as will be described later.

Residual Endemic Foci

When the problems of Uganda and Kenya came under study in 1956 the disease was everywhere at low endemic-levels, following one, two or even three epidemics which had been only partially controlled. During the investigation two outbreaks occurred in former endemic areas, providing unique material for observing the ecology of the low endemic and its potentialities for expansion.

Under endemic conditions the true nature of primary foci becomes apparent. Infections are located in very small areas, sometimes only a dozen square miles in extent, and within these areas their transmission occurs in even more limited foci, along a few miles of river or lake shore or on two or three streams. In these narrow foci, however, sleeping sickness is stubbornly persistent, often surviving repeated attempts at its eradication. It retains a dangerous viability and power of expansion, so that renewed outbreaks can arise when control efforts are relaxed or with changed ecological conditions. Thus, along the Kenya shores of Lake Victoria T. gambiense has been present for 60 years; there have been three epidemic outbreaks, in 1902, 1929 and 1949, and infection is present today in several of the foci where it first appeared. Close to Lake Edward, in Uganda, a small endemic focus held this disease for 30 years and gave rise to three separate outbreaks. A striking example comes from Uganda's West Nile District, where a small epidemic has recently developed in the identical locality, on two small rivers, which marked the start of the first big epidemic in 1929 and the second in 1936. In the intervening years infections have never been absent from this focus, although they disappeared entirely from the rest of the District. Equally instructive is the recent major epidemic in Northeast Ghana, which developed from a 30-year-old focus and, in the process, exhibited a classic pattern of zonation.

Ecology of the Foci

During these endemics the incidence of infection can be as low as 0-2 or 3 cases annually, with an average less than 10 over a series of years. It is difficult to visualize how a host-specific parasite, not easily transmissible, could persist where these small numbers of infections are widely distributed through a large population and area. Their concentration into limited foci is a logical necessity for their survival. With the disease restricted to a few villages, sometimes to certain sections of the community such as fishermen and canoe crews, infections can occur with sufficient frequency to ensure the maintenance of an endemic within these definite foci.

Three sets of factors contribute to make this possible.

(1) Available records commonly underestimate the true incidence of infections. Inaccurate data can result from:

(a) Inadequate sampling, the proportion of the population seen may be too small, and selective, with the really sick unable to come in or concealed for social or other reasons. (b) Failures in diagnosis.

(2) The mild, prolonged onset of the disease allows a patient to move about freely for years (an 11-year record comes from Togoland) before he feels ill enough to seek treatment. His eventual diagnosis, a unit entry in the records, may represent a reservoir of infection for the previous 4-5 years.

(3) The relapse-rate after treatment is frequently high, and is increased by an all too frequent failure to complete treatment. As much as 50% relapses have been noted a year or two after patients have been considered cured. Relapsed cases can become infective again to the tsetse. Here a unit entry in the records may represent a source of infection both at the time and a year or two later.

Thus, for several reasons, there can be unexpected reservoirs of infection in endemic foci which do not appear in the annual records of sleeping sickness, and which make the incidence sufficient to maintain a strain of T. gambiense even through long periods of low endemicity.

The location of the primary endemic foci is dependent on the common need of both tsetse and man for water. In the dry savanna zones of Africa surface water is restricted, particularly during the 4-6 months dry season, when even a river may be reduced to a series of pools, and streams and marshes dry up completely. Tsetse and people are then forced into close daily contact, the fly because of its riparian habitat, the people because their whole economy is centered on the rivers, for their water, for good grazing and farm land, for timber and firewood, for fishing and hunting. When the population is high the association between man and tsetse, the "man-fly contact," becomes even closer. People are more abundant; their activities restrict the fly's habitat by bush cutting, and its food by killing off the game so that it is eventually feeding solely on man and his domestic stock.

Two features mark the primary foci, a high population density and a high ratio of linear fly-belt per unit of country. The latter is caused by an exceedingly winding river, a network of streams, or both. A ratio approaching

or reaching one mile of G. palpalis habitat per square mile of country, and a human population of 80-200 per square mile seem decisive.

Under these conditions the people and tsetse are in such close contact, often with villages occupying both banks of a river and with fly-belt only a few hundred yards from dwellings, that virtually 100% of the people are bitten every day. Even those too old or sick to go out would get bitten at home by tsetse following people or cattle back to the village from the waterside. It is easy to see that, once a case of trypanosomiasis is introduced into such a community, it will sooner or later infect one or more tsetse, and these flies, with their limited range and restricted choice of hosts, will sooner or later pass on the infection. It is difficult to visualize T. gambiense ever disappearing, short of outside interference. Even so, as history shows, interference in the form of control operations has proved, more often than not, inadequate to bring about the final eradication of the parasite.

History also shows the explosive qualities latent in these endemics, the dangers of rating them at face value as problems of minor importance. Uganda's Lake Edward epidemics, with 100-300 cases, followed closely on years in which 0-5 cases were recorded. In Kenya, the very experienced observer, Hale Carpenter, surveyed 100 miles of Lake Victoria coast in 1924 without diagnosing a single case of sleeping sickness. In 1930, 224 cases occurred in the areas he had traversed. In a recent epidemic in northern Uganda an incidence of 2-10 cases annually was recorded from 1950-55; in December 1956, 29 new cases were discovered; in 1957 they numbered 261.

The change from endemic to epidemic status has, when observed, been found to follow an increase in the degree of man-fly contact. This has resulted from abnormal drought, concentrating people and tsetse at even more restricted water points; from famine, causing excessive movement of people to distant markets and into the bush for fishing, hunting and wild foods; through administrative or social changes. These may be unfavorable, with a breakdown of routine control measures or refusal of the people to accept them.

Bearing on Control

The significance of the focal pattern for planning control operations was recognized by the French when their attack on the vast pandemic in French West Africa was organized by Muraz in 1939. Their sleeping-sickness areas were classified into zones of heavy, light and very light infection, and the intensity of control operations was graded accordingly. The result was spectacular. By 1945 their epidemics were under a high degree of control; by 1955 the disease was of minor importance only.

In the Gold Coast (now Ghana) the process was taken a step further, with the development of focal attack. In the most severely infected Northwestern area, control operations were concentrated on the primary epidemic foci, with sufficient intensity to eliminate the vector tsetse completely. Adjacent lightly infected secondary zones were left uncontrolled. The effectiveness of the method was apparent in 1952, when a 99% control of trypanosomiasis in the epidemic

foci was causing spontaneous reductions, at high rates, in the uncontrolled secondary zones to the east and south. A final test came in 1957-59, when a serious outbreak, with more than 900 cases, developed in an endemo-epidemic area in the northeast, where the foci, infected since 1933, had never been brought under complete control. In contrast, the area of focal attack in the northwest remained almost free from the disease, with the exception of one small outbreak with 29 cases, and this was traced to the introduction of infection from one of the eastern foci.

If the principle of focal attack is effective against major epidemics, it can be even more effective against the low endemic. At this stage the primary foci are much easier to detect, and it may happen that, during the trough of the endemic, infections are being transmitted at only one or two points in a potentially larger endemic focus. That the final eradication of T. gambiense at this stage can be achieved with an absolute minimum of effort and of interference to the country has been well shown in Uganda. In the Lake Edward endemic area, partial control of the epidemics in 1942 and 1946 left a low incidence of 1-4 cases a year, and from 1953 until 1955 these all arose on a stream, although the potential endemic focus, which had held infections since 1930, was 40 square miles in extent and traversed by 8 G. palpalis-infested streams. In 1955 the Uganda Tsetse Control Department eliminated G. palpalis from that one infected stream by spraying its habitat, a total of 4 miles, with DDT. Since then not a single sleeping sickness case has been recorded, either from this locality or from the District as a whole. Six years without an infection must be accepted as final eradication of the disease. This remarkable achievement provides an irrefutable argument for the efficiency of focal attack.

Unfortunately, in its low endemic state the disease appears unimportant to medical and administrative authorities, and action is extremely difficult to obtain. But trypanosomiasis, like any other epidemic, is a dynamic, not a static, entity. Its endemic foci present the paradox of vulnerability coupled with explosive potentialities. To ignore the lesson patent in these facts may increase the problems of control several hundredfold. To control the 1957 epidemic in Northern Uganda it was necessary to spray 300 miles of fly-infested streams. To the cost, 8,000 pounds sterling, must be added a comparable sum for finding and treating the several hundred cases which developed. This is the measure by which to gauge the merits of the Lake Edward success. It drives home, in material terms, the gains derived from the teachings of ecology.

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Sixth Annual Seminar on the Prophylaxis of Streptococcal Infections

The Sixth Annual Seminar on the Prophylaxis of Streptococcal Infections sponsored by the Armed Forces Epidemiological Board will be held at the U. S. Naval Hospital, Great Lakes, Illinois, on 1-2 October 1962.

Activities desiring to send representatives to this seminar should submit letter requests to BUMED, Attention Code 316, in accordance with BUMED Instruction 1520.8 prior to 20 August 1962.

RESERVE**SECTION**Notification Policy Set for Any Future Call-Up

One of the problems connected with last fall's partial mobilization concerned the timing of the release of information to the press media and the alert notification to individual Reservists.

A survey conducted by the Army indicated that 86% of the Reservists learned of the recall of their unit from news media rather than through command channels.

To prevent a recurrence of this problem, a system has been devised to notify most members of recalled units through official channels prior to, or concurrent with, release of the information to news media.

To accomplish this, each military department will use an alerting system for notifying members or recalled units capable of meeting the following schedule when "F-hour" is the time a decision is announced to the military department by the Secretary of Defense:

F-hour: Secretary of Defense directs military departments to order recall and makes general announcement of numbers by service and of duration of service.

F+12 hours: All active establishment headquarters concerned are notified by classified message.

F+12 to F+18 hours: Unit commanders and advisers of all affected Reserve units are notified by secure means.

F+18 hours: Units institute alert notification to individuals.

F+24 hours: Detailed information is made available to Congress, followed by a public announcement by SecDef.

At the time SecDef directs the military departments to initiate a call-up of Reservists, he will make a general press announcement indicating the number of Reservists to be recalled and the length of time their services may be required, but he will not identify the units. The "F+24 hour" announcement will contain the designation of units. This information will be given first to members of Congress and then to the news media.

This is not to be interpreted as indicating in any way that any future call-up of Reservists and Guardsmen is imminent or contemplated.

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Independence? That's middle class blasphemy. We are all dependent on one another, every soul of us on earth.

—George Bernard Shaw

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